CLAIMS

What is claimed is:

1. An interconnection element comprising:

a first resilient element with a first contact region and a second contact region and a first securing region; and

a second resilient element, with a third contact region and a second securing region, coupled to the first resilient element through respective securing regions and positioned such that upon sufficient displacement of the first contact region toward the second resilient element, the second contact region will contact the third contact region,

wherein the interconnection element is of a size suitable for connecting two electronic devices.

2. The interconnection element of claim 1, further comprising an attachment element, wherein the second resilient element comprises a third securing region and is coupled to the first resilient element at the second securing region and the attachment element at the third securing region.

3. The interconnection element of claim 1, comprising a plurality of resilient elements coupled through respective securing regions and selected such that collectively the

interconnection element has a spring constant determined by a sum of the spring constants of the plurality of resilient elements.

4. The interconnection element of claim 1, comprising a plurality of resilient elements coupled through respective securing regions, each one of the plurality of resilient elements oriented to interact with an adjacent one of the plurality of resilient elements upon sufficient displacement.

5. The interconnection element of claim 4, wherein the plurality of resilient elements are of similar form and oriented in an aligned relation, each resilient element adapted to sequentially engage an adjacent resilient element upon sufficient displacement such that the engaged resilient element reinforces the displaced resilient element.

6. The interconnection element of claim 1, wherein each of the resilient elements are of similar form.

7. The interconnection element of claim 6, wherein each of the resilient elements comprises a rectangular beam, having a length, a width, and a thickness.

8. The interconnection element of claim 7, wherein one of the length and the thickness of the first resilient element is

different than the respective length and thickness of the second resilient element.

9. The interconnection element of claim 7, wherein the length and the thickness of the first resilient element is similar to the respective length and thickness of the second resilient element.

10. The interconnection element of claim 7, wherein the thickness of at least one of the first resilient element and the second resilient element is less than one mil (25 microns).

11. The interconnection element of claim 7, wherein at least one of the first resilient element and the second resilient element has a length of about 12 mils (300 microns) and a width of about 3 mils (75 microns).

12. The interconnection element of claim 1, wherein the interconnection element is of a size suitable for directly contacting a semiconductor device.

13. The interconnection element of claim 1, wherein the interconnection element is of a size suitable for directly contacting a chip-scale device.

14. The interconnection element of claim 1, further comprising a substrate, wherein the second resilient element comprises a third securing region and is coupled to the first resilient element at the second securing region and the substrate at the third securing region.

15. The interconnection element of claim 14, wherein the interconnection element is electrically coupled to the substrate.

16. The interconnection element of claim 15, wherein the substrate is one of a semiconductor, a ceramic, and a polymeric substrate.

17. The interconnection element of claim 1, further comprising a substrate, wherein the interconnection element is coupled to the substrate together with a plurality of other interconnection elements and the interconnection element is of a size suitable for contacting a contact pad of a semiconductor device arranged with a plurality of other contact pads at a pitch less than about 10 mils.

18. The interconnection element of claim 1, wherein the contact of the second contact region with the third contact region

comprises at least one of a mechanical and an electrical contact.

19. An interconnection element comprising:

a first resilient element with a first contact region and a second contact region and a first securing region; and

a second resilient element, with a third contact region and a second securing region, coupled to the first resilient element through respective securing regions and positioned such that upon sufficient displacement of the first contact region toward the second resilient element, the second contact region will contact the third contact region,

wherein the interconnection element is capable of connecting two electronic devices.

20. The interconnection element of claim 19, wherein upon further displacement, the first contact region will displace the second resilient element.

21. The interconnection element of claim 19, further comprising an attachment element, wherein the second resilient element comprises a third securing region and is coupled to the first resilient element at the second securing region and the attachment element at the third securing region.

22. The interconnection element of claim 19, comprising a plurality of resilient elements coupled through respective securing regions and selected such that collectively the interconnection element has a spring constant determined by the sum of the spring constants of the plurality of resilient elements.

23. The interconnection element of claim 19, comprising a plurality of resilient elements coupled through respective securing regions, each one of the plurality of resilient elements oriented to interact with an adjacent one of the plurality of resilient elements upon sufficient displacement.

24. The interconnection element of claim 23, wherein the plurality of resilient elements are of similar form and oriented in an aligned relation, each resilient element adapted to sequentially engage an adjacent resilient element upon sufficient displacement such that the engaged resilient element reinforces the displaced resilient element.

25. The interconnection element of claim 19, wherein each of the resilient elements are of similar form.

26. The interconnection element of claim 25, wherein each of the resilient elements comprises a rectangular beam, having a length, a width, and a thickness.

27. The interconnection element of claim 26, wherein one of the length and the thickness of the first resilient element is different than the respective length and thickness of the second resilient element.

28. The interconnection element of claim 26, wherein the length and the thickness of the first resilient element is similar to the respective length and thickness of the second resilient element.

29. The interconnection element of claim 26, wherein the thickness of at least one of the first resilient element and the second resilient element is less than one mil (25 microns).

30. The interconnection element of claim 26, wherein at least one of the first resilient element and the second resilient element has a length of about 12 mils and a width of about 3 mils (75 microns).

31. The interconnection element of claim 19, wherein the interconnection element is of a size suitable for directly contacting a semiconductor device.

32. The interconnection element of claim 19, wherein the interconnection element is of a size suitable for directly contacting a chip-scale device.

33. The interconnection element of claim 19, further comprising a substrate, wherein the second resilient element comprises a third securing region and is coupled to the first resilient element at the second securing region and the substrate at the third securing region.

34. The interconnection element of claim 33, wherein the interconnection element is electrically coupled to the substrate.

35. The interconnection element of claim 34, wherein the substrate is one of a semiconductor, a ceramic, and an organic substrate.

36. The interconnection element of claim 19, further comprising a substrate wherein the interconnection element is coupled to the substrate together with a plurality of other interconnection

elements and the interconnection element is of a size suitable for contacting a contact pad of a semiconductor device arranged with a plurality of other contact pads at a pitch less than about 10 mils.

37. An interconnection element comprising:

a first resilient element with a first contact region and a second contact region and a first securing region; and

a second resilient element, with a third contact region and a second securing region, coupled to the first resilient element through respective securing regions and positioned such that upon sufficient displacement of the first contact region toward the second resilient element, the second contact region will contact the third contact region,

wherein at least one of the first resilient element and the second resilient element is formed by lithographic patterning of material and deposition in a defined shape and of a size suitable for connecting two electronic devices.

38. The interconnection element of claim 37, further comprising an attachment element, wherein the second resilient element comprises a third securing region and is coupled to the first resilient element at the second securing region and the attachment element at the third securing region.

39. The interconnection element of claim 37, comprising a plurality of resilient elements coupled through respective securing regions and selected such that collectively the interconnection element has a spring constant determined by the sum of the spring constants of the plurality of resilient elements.

40. The interconnection element of claim 37, comprising a plurality of resilient elements coupled through respective securing regions, each one of the plurality of resilient elements oriented to interact with an adjacent one of the plurality of resilient elements upon sufficient displacement.

41. The interconnection element of claim 40, wherein the plurality of resilient elements are of similar form and oriented in an aligned relation, each resilient element adapted to sequentially engage an adjacent resilient element upon sufficient displacement such that the engaged resilient element reinforces the displaced resilient element.

42. The interconnection element of claim 37, wherein each of the resilient elements are of similar form.

43. The interconnection element of claim 42, wherein each of the resilient elements comprises a rectangular beam, having a length, a width, and a thickness.

44. The interconnection element of claim 43, wherein one of the length and the thickness of the first resilient element is different than the respective length and thickness of the second resilient element.

45. The interconnection element of claim 43, wherein the length and the thickness of the first resilient element is similar to the respective length and thickness of the second resilient element.

46. The interconnection element of claim 43, wherein the thickness of at least one of the first resilient element and the second resilient element is less than one mil (25 microns).

47. The interconnection element of claim 43, wherein at least one of the first resilient element and the second resilient element has a length of 12 mils (300 microns) and a width of 3 mils (75 microns).

48. The interconnection element of claim 37, wherein the interconnection element is of a size suitable for directly contacting a semiconductor device.

49. The interconnection element of claim 37, wherein the interconnection element is of a size suitable for directly contacting a chip-scale device.

50. The interconnection element of claim 37, further comprising a substrate, wherein the second resilient element comprises a third securing region and is coupled to the first resilient element at the second securing region and the substrate at the third securing region.

51. The interconnection element of claim 50, wherein the interconnection element is electrically coupled to the substrate.

52. The interconnection element of claim 51, wherein the substrate is one of a semiconductor, a ceramic, and an organic substrate.

53. The interconnection element of claim 37, further comprising a substrate, wherein the interconnection element is coupled to the substrate together with a plurality of other interconnection

elements and the interconnection element is of a size suitable for contacting a contact pad of a semiconductor device arranged with a plurality of other contact pads at a pitch less than about 10 mils (250 microns).

54. An interconnection element comprising:

a body comprising a plurality of resilient elements, a first resilient element defining a first surface of the body and a surface of a second resilient element defining a second surface of the body; and

an attachment element coupled to one of the first surface and the second surface of the body and of a size suitable for coupling to a contact region of an electronic device, and

wherein one of the plurality of resilient elements is deformed it engages another one of the plurality of resilient elements which reinforces the engaging resilient element.

55. The interconnection element of claim 54, wherein the plurality of resilient elements are coupled through respective securing regions and selected such that collectively the resilient elements define a predetermined spring constant.

56. The interconnection element of claim 54, wherein the plurality of resilient elements are of similar form and oriented in an aligned relation.

57. The interconnection element of claim 56, wherein the resilient elements comprise a rectangular beam, having a length, a width, and a thickness.

58. The interconnection element of claim 57, wherein one of the length and the thickness of the first resilient element is different than the respective length and thickness of the second resilient element.

59. The interconnection element of claim 57, wherein the thickness of at least one of the first resilient element and the second resilient element is less than one mil (25 microns).

60. The interconnection element of claim 57, wherein at least one of the plurality of resilient elements has a length of about 12 mils (300 microns) and a width of about 3 mils (75 microns).

61. The interconnection element of claim 56, wherein the first resilient element comprises a portion of cylinder.

62. The interconnection element of claim 54, wherein the interconnection element is electrically coupled to a substrate.

63. The interconnection element of claim 62, wherein the substrate is one of a semiconductor, a ceramic, and a polymeric substrate.

64. The interconnection element of claim 54, further comprising a substrate, wherein the interconnection element is coupled to the substrate together with a plurality of other interconnection elements and the interconnection element is of a size suitable for contacting a contact pad of a semiconductor device arranged with a plurality of other contact pads at a pitch less than 10 mils (250 microns).

65. The interconnection element of claim 54, wherein the interconnection element is of a size suitable for directly contacting a semiconductor device.

66. The interconnection element of claim 54, wherein the interconnection element is of a size suitable for directly contacting a chip-scale device.

67. An electronic assembly comprising:

a plurality of interconnection elements coupled to a substrate and configured in a relation to contact an array of contact pads of an electronic device, each interconnection element comprising:

a first resilient element with a first contact region and a second contact region and a first securing region; and

a second resilient element with a third contact region and a second securing region coupled to the first resilient element through respective securing regions and positioned such that upon sufficient displacement of the first contact region towards the second resilient element, the second contact region will contact the third contact region.

68. The electronic assembly of claim 67, wherein the plurality of interconnection elements comprise a plurality of resilient elements coupled through respective securing regions and selected such that collectively each of the interconnection elements has a predetermined spring constant determined by the sum of the spring constants of the plurality of the resilient elements.

69. The electronic assembly of claim 68, wherein the resilient elements of each of the plurality of interconnection elements are of similar form and oriented in an aligned relation.

70. The electronic assembly of claim 69, wherein the resilient elements comprise a rectangular beam, having a length, a width, and a thickness.

71. The electronic assembly of claim 67, wherein the substrate is one of a semiconductor, a ceramic, and an organic substrate.

72. The electronic assembly of claim 67, wherein the interconnection elements are of a size suitable for contacting a contact pad of a semiconductor device arranged with a plurality of other contact pads at a pitch less than about 10 mils (250 microns).

73. The electronic assembly of claim 67, wherein the interconnection elements are of a size suitable for contacting an array of contact pads on a semiconductor device.

74. The electronic assembly of claim 67, wherein the interconnection elements are of a size suitable for contacting an array of contact pads of a chip-scale device.

75. The electronic assembly of claim 67, wherein a first interconnection element and a second interconnection element are arranged on the substrate such that upon sufficient displacement of the first contact region of the first interconnection element, the first interconnection element contacts the second interconnection element.

76. The electronic assembly of claim 75, wherein the contact of the first interconnection element and the second interconnection element is one of an electrical and a mechanical contact.

77. An interconnection element comprising:

a first resilient element having a contact point;

a second resilient element; and

an attachment element that defines a space between the first resilient element and the second resilient element,

wherein a first projection through the attachment element is parallel to a second projection between the first resilient element and the second resilient element and to a third projection between the first resilient element and the second resilient element and a vector between the first projection and the second projection has a direction different than a vector in the same plane between the first projection and the third projection, and

wherein upon the application of sufficient force on the contact point, each of the first resilient element and the second resilient element will deform.

78. The interconnection element of claim 77, wherein each of the resilient elements are of similar form.

79. The interconnection element of claim 78, wherein each of the resilient elements comprises a portion of a circle.

80. The interconnection element of claim 77, wherein at least one of the resilient elements has an opening therethrough.

81. The interconnection element of claim 77, wherein at least one of the resilient elements comprises one of a clover shape, a rectangular shape, and an H-shape.

82. The interconnection element of claim 77, wherein the interconnection element is of a size suitable for directly contacting a semiconductor device.

83. The interconnection element of claim 77, wherein the interconnection element is of a size suitable for directly contacting a chip-scale device.